

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSTRUCTION SPECIFICATIONS**

**FENCE - PERMANENT NON-ELECTRIC HIGH TENSILE**

**(Ft.)**

**CODE 382**

**CONSTRUCTION SPECIFICATIONS**

**IV. Permanent Non-electric High  
Tensile Fences**

**(Also, refer to Fence drawings)**

**A. Wire Spacing**

Spacing of line posts and stays depends on terrain and number of wires. Farm border fences and roadside fences must be constructed of at least seven wires, with the total height to the top wire not less than 42 inches.

Cross fences can be constructed of six or more wires, with the fence height being at least 42 inches.

**B. Type of Wire**

Wire shall be high tensile 12.5 gauge wire with a minimum of 170,000 psi breaking strength, with Type III galvanizing or aluminum. Typically, triple galvanized 12.5 gauge wire with 170, 000 psi minimum breaking strength is installed. The 170,000 psi wire is much easier to work with than the 210,000 psi wire.

**C. Pull Assemblies**

For high tensile fence, two posts with brace and brace wire shall be spaced at intervals less than ½ miles on straight sections and flat terrain of the fence. Where turns are encountered, additional wire strainers will be installed for proper tension on fence. Wire must be kept tight.

**D. Post Spacing, Length and Depth**

Install line posts in dips and rises first. Line posts shall be spaced 16 feet or less apart with no stays required. Line posts may be spaced up to 30 feet apart with stays or light posts between the posts.

For suspension fences, place posts up to 100 feet apart. Evenly place stays 33 feet to 50 feet apart and do not allow them to touch the ground.

In undulating terrain, space posts and stays so that fence height is maintained. Posts in dips shall be anchored so that they will not pull out of the soil. Posts shall be at least 24 inches in the ground. All wood posts will be at least 2 inches higher than the top wire of the fence to

prevent splitting when attaching insulators. All posts of other materials shall be at least 1 inch higher than the top wire of the fence.

Steel posts and other line post shall be driven minimum of 18" deep, use standard "T" or "U" shaped steel posts minimum of 5.5 ft. long. In very loose or very sandy soils, posts will be driven deeper and should be longer.

Post spacing in areas shallow to rock may vary based on availability of post sites. Probe to determine desirable post sites. Steel pipe and steel posts are recommended to use in cracks between rocks. Use concrete where possible to secure posts. Rock bits are available in some areas for drilling rock. Use stays to maintain wire spacing. Post set in a 5 gallon bucket of concrete, buried deep as possible, or similar container may be used as a line posts. Use live trees as posts where needed. See section F.

#### E. Line Posts and Stays

The following posts and stays may be used:

- a. Australian ironwood (eucalyptus), 1 x 1.5 inches minimum length and width dimension.
- b. Fiberglass and polyvinylchloride solid round sucker rod of at least 5/8" in diameter.
- c. Fiberglass T-posts and stays of at least 1" in cross-section.

For the above posts, attach wire to posts by loose clips or by running through holes in posts. Attach to stays with tight clips to hold in place.

Wood posts of black or honey locust, red cedar, Osage Orange, catalpa, mulberry, pressure treated pine, or other wood of equal life and strength. At least one-half of the diameter of the red cedar shall be heartwood. Pressure treatment shall conform to American Wood-Preservers' Association standard, U1-06, UC4A. Below are some common preservative treatments with minimum retention rates:

Treatment	Retention lb/ft <sup>3</sup>
Creosote coal tar	10
Pentachlorophenol	.5
Amoniacal copper arsenate	.4
Chromated copper sulfate	.4
Alkaline copper quat (ACQ)*	.4

\* Do not use aluminum fasteners or metals when using wood treated with ACQ. Use hot dipped galvanized treated fasteners or metals.

- d. Steel posts may be "T" or "U" posts that are a minimum of high carbon steel weight of 1.25 pounds per one foot of length. They will have an anchor plate and be studded, embossed, or punched for wire attachment. Metal posts will be galvanized, enameled and baked, or painted with weather resistant steel paint.

#### F. Live Trees as Line, Bracing and Corner Posts

Live trees used for corner, bracing, and line posts shall have a diameter breast height (DBH) equal to or greater than those prescribed for

normal wooden posts. Some alignment variation shall be allowed, but caution should be taken to minimize offsets and prevent excess fencing needs. Wires will not be fastened directly to trees.

When using live trees, protection will be provided between the tree and wire (UC3 treated 2" x 4" board, fiberglass, or rigid plastic strip). Avoid using potentially high-value timber trees. Do not use fast growing trees as end posts.

#### **G. Corners and Braces**

Braces and end assemblies are required at all corners, gates, and angles up to 150 degrees in the fence line. No brace assembly is required for angles between 150 and 180 degrees however, do use a 5" diameter post as a corner post. Lean the corner post 2" or more away from the direction of pull.

Corner, gate, and end or pull assemblies for non-electric high tensile fences will be either H-brace, N-brace, or a floating angle brace assembly. Posts will be at least 5-inch nominal wood or 2.5" nominal steel pipe (capped). Steel pipe shall be set in concrete 30" deep. Wood posts will be sufficient lengths to permit driving or setting the post at least 36" deep. Earth backfill shall be thoroughly tamped. If concrete is used, set the posts a minimum of 30" deep in a 12-inch-wide hole.

All wood posts will be at least 2 inches higher than the top wire of the fence to prevent splitting when attaching insulators.

All posts of other materials shall be at least 1 inch higher than the top wire of the fence.

#### **H. Bracing**

The brace member shall be the equivalent of a 4-inch top diameter post or standard weight galvanized steel pipe of 2-inch diameter installed at least 3 feet above ground or between the top two wires, whichever is higher. Place brace at least 8 inches below top of post. The brace member shall be at least 6 feet long or 2.5 times the height of the top wire (i.e.,  $42'' \times 2.5 = 105''$  or 8.75').

The brace wire shall be number 9 gauge smooth wire or 12 1/2-gauge high tensile strength smooth wire. Twist sticks or inline strainers will be used to tighten brace wire.

#### **I. Staples and Fasteners**

Wires will be attached to line posts by a method that allows wires to slip. If stays are used, wires will be attached to stays in a manner that prevents stay slippage along the fence.

Staples shall be of hot-dipped, galvanized 9-gauge steel or heavier with a minimum length of 1½ inches for softwoods and a minimum length of 1 inch for close-grained hardwoods. Barbed staples shall be used for softwood posts. Drive staples diagonally to the wood's grain and at a slight downward angle (upward if pull is up) to avoid splitting posts and loosening of staples. Space should

be left between staple and post to permit free movement of wire.

Splicing of high tensile wire will be accomplished by three crimping sleeves, “figure eight knots,” or “square knots.”

Tying of high tensile wire to end posts will be accomplished using “thread through method” or two crimping sleeves. Tension of wires will be designed to maintain the proper average height of the fence wire and tightness to provide wire contact with animals.

The tension on each wire shall be maintained according to type of grazing animal. Use of in-line strainers, staggered, will be used on each wire to obtain the correct tension. Tension springs are optional, but are helpful in maintaining proper tension and absorbing sudden shocks to the wire.